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PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION.

Method of and Apparatus for the Manufacture of Food for Dogs and other Animals.

We, THE MOLASSINE COMPANY, LIMITED, of No. 82, Tunnel Avenue, East Greenwich, London, S.E. 10, a company incorporated under the laws of Great Britain, and HARRY CHARLES DAVIS, of No. 16, Hilly Fields Crescent, Brockley, London, S.E. 4, a British subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to a method of and apparatus for the manufacture of food for dogs and other animals.

According to this invention, the method of manufacture consists in introducing the ingredients of the food, suitably consisting of small pieces of sterilized meat, finely divided dog biscuit, all in a dry state, into a heated mixing machine or mixer, discharging a jet or jets of steam into the mixer to moisten or saturate, heat and sterilise the ingredients, discharging binding material in an atomised condition into the mixing machine, discharging the blended and saturated ingredients into a cooking kettle or kettles or the like, from whence the cooked ingredients are passed in a semi-liquid or pasty condition on to a travelling belt or conveyor whereon the mass in layer-form is partially dried and then compressing and moulding it into small cakes or so-called "nuts". The steam, employed to moisten, heat and sterilise the ingredients, is or may be delivered at a low pressure and superheated. Moreover, the steam is preferably discharged into the mixer in a direction contrary to that in which the ingredients travel along in the mixer or in more than one direction. The binding material suitably but not necessarily consisting of flour and water, is preferably sprayed on to and into the moving mass of ingredients during the mixing through induced current devices and/or spraying nozzles, conveniently arranged to discharge radially from at or near the inner periphery of the mixer-casing towards the centre or tangentially and for this purpose they are connected for example, to an annular supply pipe, mounted at or near the periphery of the mixer.

Suitable proportions of the dry ingredients are, by weight:—

Sterilised meat - - - - -	75%
Finely divided dog biscuit - -	20%
Binding material, such as flour -	5%
	100

A suitable steam pressure is, say five pounds and the temperature may be 220 degrees C. Compressed air for spraying the binding material is conveniently supplied by a blower and the pressure suitably is 150 pounds to the square inch.

The apparatus for carrying out the process of manufacture comprises a mixer furnished with a power-driven shaft rotatable in bearings at each end of the mixer casing or at each end thereof and intermediately. The shaft is provided with paddles or mixer-arms so shaped or constructed as to cause the ingredients to be intimately mixed and travel relatively slowly from one end to the other of the mixer casing. The latter is provided at the admission-end with a hopper and at the discharge end it is provided with a spout or the like to guide the ingredients which, by that time, are in a semi-liquid or pasty condition. The mixer is surrounded by a jacket supplied with live or exhaust steam to heat it and with a steam pipe which is so disposed as to discharge steam into or near the exit-end and in a direction contrary to that of the travel of the ingredients while being mixed. The binding material, conveniently con-

sisting of a mixture of flour and water contained in a vat or receptacle which may be heated is connected by a pipe furnished with a valve to an induced current apparatus to which heated or unheated air is supplied by a blower or the like. The stream of liquid adhesive or binding material and air is then conducted under pressure by a pipe to an annular ring-shaped or curved pipe or pipes disposed within the mixer and furnished with radially or tangentially disposed spraying nozzles or devices which pulverise the liquid adhesive and causes it to produce a curtain or curtains of fine or dense mist of adhesive in the interior of the mixer. This mist of adhesive is consequently well distributed throughout the interior of the mixer and its contents and owing to the continual movement or agitation of the other ingredients, they also absorb the adhesive so that it becomes thoroughly distributed throughout the mass. Or, instead of mounting the ring-shaped or curved adhesive-supply pipe or pipes within the mixer, it or they may be mounted outside thereof and the discharge ends of the spraying nozzles pass through the jacket and project into the interior of the mixer-casing or are about flush with its inner periphery. The semi-liquid or paste-like ingredients, now having binding material incorporated therewith is discharged from the mixer on to an endless conveyor, consisting of a band of fabric or other appropriate material passing over driven and supporting pulleys, and in passing along it becomes partly dried. If desired, the endless conveyor may pass through a drying chamber which is heated by steam or into which is directed a current of hot air to evaporate most of the remaining moisture. At the end of the endless conveyor, remote from the mixer, the partially dried food mixture is delivered to a moulding machine of any suitable construction which moulds or compresses the mixture into small cakes or "nuts" such as are suitable for the dog or other animal for which the food is intended. Any appropriate moulding machine may be employed, for example, such as is provided with a pair of rolls furnished with projections or teeth and grooves or recesses and the layer of food mixture passing between them is compressed into a number of small cakes of pyramidal, cube-like or other appropriate shape. In some cases, these small cakes are united or joined together by small fins when they pass out and, therefore, after passing out of the moulding machine, they are preferably passed over a bar screen which removes or breaks off the fins. The small cakes then travel on to an endless or travelling cooling band and into a receiving hopper or chamber at the end thereof which hopper or chamber is provided with a blower to supply air under pressure in order to cool the cakes still further and remove the dust.

Dated this 13th day of November, 1925.

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COMPLETE SPECIFICATION.

Method of and Apparatus for the Manufacture of Food for Dogs and other Animals.

We, THE MOLASSINE COMPANY, LIMITED, of No. 82, Tunnel Avenue, East Greenwich, London, S.E. 10, a company incorporated under the laws of Great Britain, and HARRY CHARLES DAVIS, of No. 16, Hilly Fields Crescent, Brockley, London, S.E. 4, a British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a method of and apparatus for the manufacture of food for dogs and other animals.

According to this invention, the method of manufacture consists in introducing in a dry state into a heated mixer, the ingredients of the food suitably consisting of small pieces of sterilized meat, and finely divided dog biscuit, subjecting the ingredients in the mixer to the action of a jet or jets of steam to moisten or saturate, and further heat and sterilise the mass, introducing binding material in an atomized condition into the mixer to commingle with the ingredients, and for compressing or moulding the mass discharged from the mixer, into biscuits or small cakes known as "nuts".

The steam which is injected into the mixer in the form of a jet or jets, may be superheated and delivered under low pressure of say 5 lbs. preferably in a direction contrary to that in which the ingredients are caused to travel by the

action of mixing means in the mixer. The steam preferably at a temperature of about 220° C. may, however, be injected in more than one direction. A suitable binding material consists of flour and water, but may comprise other materials, and is sprayed on to the ingredients during mixing by means of induced current devices which force the said binding material, in a radial or tangential and preferably longitudinal direction of the mixer casing through spraying nozzles or the like arranged near the periphery of the said casing. For this purpose nozzles may be provided in an annular pipe or pipes, mounted at or near the inner periphery of the cylindrical mixer or at the annular pipe may be suitably perforated for producing the desired spray of binding material which is ejected from the nozzles or perforations by air under a pressure of say 150 lbs. per square inch and produced by means of a blower or other suitable means.

Suitable proportions of the dry ingredients for manufacturing the food are by weight as follows:—

Sterilised meat - - - - - -	75%
Finely divided dog biscuit - -	20%
Binding material, such as flour -	5%
	100

An example of the mixer employed in carrying out the method of manufacture according to this invention is shown diagrammatically in sectional elevation by the accompanying drawing.

This mixer comprises stationary inner and outer horizontal cylinders *a b* respectively spaced apart and provided with end walls or covers *c c*¹. The space between the cylinders forms a jacket into which steam or other heating medium is introduced to heat the inner cylinder *b*. Formed in the end wall *c* is an aperture, with which a chute *d* communicates and through which ground ingredients of the food fed into a hopper *e* are discharged into the cylinder *b* for treatment therein.

Extending horizontally through the centre of the inner cylinder *b* and supported in bearings *f*, preferably comprising stuffing boxes in the end walls *c c*¹ is a shaft *g* adapted to be power driven as by means of a belt pulley *h* secured to the shaft *g* suitably at that end which projects beyond the end wall *c*¹ at the delivery end of the mixer.

Provided on the shaft *g* within the cylinder *b* are several paddles or stirrers, which may take the form of blades or vanes *j*, fixed to the outer ends of arms *k* radiating from the shaft *g*, the angle of the blades or vanes being such as to cause ingredients delivered to the mixer through the end wall *c*, to travel slowly through the heated inner cylinder to the delivery end thereof, and also to cause at the same time a stirring of the ingredients during the rotation of the shaft *g*.

Arranged within the inner cylinder *b* are one or more ring pipes which lie close to the inner periphery of the cylinder and each have nozzles or perforations. In the drawing one such pipe *l* is shown close to the inlet end of the mixer. This pipe *l* is provided or formed with nozzles or perforations *m* whereby binding or adhesive material supplied to the pipe *l* in the manner hereinafter described, is projected into the mixer in the form of a curtain or curtains of fine or dense mist or spray which is distributed throughout the interior of the mixer, so that the ingredients during their continual movement and agitation, by means of the stirrers *j*, absorb the adhesive which is thoroughly distributed throughout the mass.

The ring pipe *l* is connected by a pipe *l*¹ to the smaller end of a conical injector casing *n*, which is by means of a pipe *o* connected to a source of supply of adhesive material preferably kept in a heated condition, the pipe *o* being provided with a valve or cock *o*¹. Entering the rear of the casing *n* and in axial alignment with the pipe *l*¹ is an air admission pipe *p* through which air heated or not and supplied under pressure by a blower or the like is injected into the smaller end of the injector casing *n* and thereby forces the adhesive material fed to the said casing, through the pipe *l*¹, into the ring pipe *l* and through the nozzles or perforations *m* into the mixer.

A steam pipe *q* projects through the end wall *c*¹ of the mixer casing, and supplies a jet of steam under low pressure and preferably superheated to about 220 degrees C., to the interior of the mixer in a direction contrary to that in which the ingredients pass through the said mixer, the said steam by its action on the ingredients further heating and sterilising the mass. If desired the steam pipe *q* may be provided with branches having a nozzle on each so as to inject steam jets at two or more points from the end wall *c*¹, or steam nozzles may be otherwise arranged and adapted to inject steam in more than one direction.

An aperture *r* closable by a flap door *s* is provided in the end wall *c*¹ through which aperture the ingredients after being treated for the desired period in the mixer, are allowed by the opening of the door *s* to discharge into a chute, by which

they are passed on to conveyor means and delivered into a moulding machine for converting the mass into biscuits or small cakes or "nuts", suitable for the dog or other animal for which the food is intended.

In order to prevent the crowding of the ingredients against the end wall c^1 while the door r is closed the shaft g at the exit end of the mixer may be provided with a vane or vanes, the angle of which is the reverse to that of the vanes j. Such a vane is shown at j^1 the action of which will be to throw a portion of the ingredients towards the admission end of the mixer.

Instead of mounting the ring shaped pipe or pipes l within the mixer, it or they may be mounted on the exterior thereof, and be provided with spraying nozzles which pass through the jacket, the ends of the nozzles through which the adhesive material is discharged projecting into the casing b or being about flush with its inner surface.

Any appropriate or known form of machine for moulding the mass into biscuits, small cakes or "nuts" may be employed, such for example as a machine provided with a pair of rolls furnished with projections or teeth and grooves or recesses, the layer of food mixture passing between them being compressed into a number of biscuits or small cakes of pyramidal, cube-like or other appropriate shape. In some cases, these are united by small fins when they pass out of the moulding machine and are passed over a bar screen which removes the fins. The biscuits or small cakes are finally passed on to a travelling cooling band and into a receiver where they are subjected to a cold air blast in order to still further cool them and remove any dust.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. The method of manufacturing food for dogs and other animals, consisting in introducing the ingredients of the food in a dry state into a heated mixer, subjecting the ingredients in the mixer to a jet or jets of steam to moisten or saturate and further heat and sterilise the mass, introducing binding or adhesive material into the mixer in an atomized condition to commingle with the ingredients, and compressing or moulding the mass discharged from the mixer into biscuits or small cakes substantially as described.

2. The method of manufacturing food for dogs and other animals as claimed in Claim 1, in which superheated steam at a low pressure is employed substantially as described.

3. The method of manufacturing food for dogs and other animals according to Claim 1 or Claim 2, in which the steam is discharged into the mixer in a direction contrary to that in which the ingredients travel substantially as described.

4. The method of manufacturing food for dogs and others animals according to Claim 1, in which the binding or adhesive material, suitably consisting of flour and water is sprayed under the action of a current of compressed air through spraying nozzles or the like to form a mist like curtain or curtains of atomized adhesive which uniformly permeates the said ingredients substantially as described.

5. Apparatus suitable for carrying out the method of manufacturing food for dogs or other animals in accordance with Claim 1, comprising a horizontal mixing chamber adapted to receive the ingredients of the food and furnished with a steam heated jacket, a shaft rotatable within said chamber, mixing blades, stirrers or paddles on said shaft to mix and propel the said ingredients, means for discharging steam into the said chamber in a direction contrary to the travel of the ingredients therein and a supply pipe having nozzles or perforations through which adhesive material is forced in the form of a spray to commingle with the ingredients substantially as described.

6. Apparatus as claimed in Claim 5, in which the adhesive material is forced through the spraying nozzles or perforations, by induced current apparatus operated by compressed air substantially as described.

7. Apparatus as claimed in Claim 5, in which the ingredients of the food are admitted through an aperture in one end of the mixing chamber and discharged through an aperture normally closed by a door at the other end and the shaft at the discharge end of the chamber is provided with a paddle or paddles which prevent the crowding of the ingredients at the discharge end substantially as described.

8. In apparatus as claimed in Claim 5 and in which the horizontal mixing chamber is cylindrical, constructing the supply pipe for the adhesive material in the form of a ring or annular conduit, arranged on or near the inner periphery of the mixing chamber, or around the exterior of the jacket, the said pipe or conduit being provided with nozzles or perforations to spray the adhesive issuing therefrom in a radial or tangential direc-